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PROCEEDINGS REPORT:

FORUM TO PRESENT RESEARCH FINDINGS ON THE SOCIOECONOMIC AND ENVIRONMENTAL IMPACTS OF THE LAND USE CONSOLIDATION PROGRAM IN RWANDA



December 2014

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PROCEEDINGS REPORT:

FORUM TO PRESENT RESEARCH FINDINGS ON THE SOCIOECONOMIC AND ENVIRONMENTAL IMPACTS OF THE LAND USE CONSOLIDATION (LUC) PROGRAM IN RWANDA

Contract No. AID=696-C-12-00002
LAND Project

The views expressed in this publication do not necessarily reflect the views of the United States Agency for International Development or the United States Government.

CONTENTS

| | |
|---|-----------|
| PROCEEDINGS REPORT: | i |
| INTRODUCTION | 7 |
| SESSION 1: OPENING AND INTRODUCTION TO WORKSHOP | 7 |
| 1.1 Opening remarks by Emily Kronic..... | 7 |
| 1.2 Welcome remarks by Anna Knox..... | 8 |
| 1.3 Objectives of the forum..... | 8 |
| SESSION 2: PRESENTATION OF RESEARCH ON THE SOCIOECONOMIC AND ENVIRONMENTAL IMPACTS OF THE LAND USE CONSOLIDATION PROGRAM | 9 |
| 2.1 Main objectives of the study..... | 9 |
| 2.2 Key challenges..... | 9 |
| 2.3 Key findings and conclusions from the study | 10 |
| 2.4 Presentation on Econometric Analysis by Benjamin (Ben) Linkow | 11 |
| SESSION 3: PLENARY DISCUSSIONS | 11 |
| SESSION 4: SMALL GROUP DISCUSSIONS | 12 |
| SESSION 5: PLENARY DISCUSSIONS ON SMALL GROUP PRESENTATIONS | 16 |
| SESSION 6: CLOSING REMARKS | 16 |
| Appendix 1: Participants' List | 17 |
| Appendix 2: Presentation on the Socioeconomic and Environmental Impacts of the Land Use Consolidation Program..... | 20 |

ACRONYMS

| | |
|----------|--|
| AAIR | Action Aid International-Rwanda |
| CIP | Crop Intensification Program |
| COP | Chief of Party |
| CSO | Civil Society Organizations |
| DDG | Deputy Director General |
| EU | European Union |
| FAO | Food Agriculture Organization |
| GoR | Government of Rwanda |
| HICD/R | Human Institutional Capacity Development Project-Rwanda |
| ILPD | Institute of Law Practice and Development |
| INADES | Institut Africain pour le Developpment Economique et Sociale |
| INES | Institut d’Enseignement Superieur de Ruhengeri |
| IRD | Institute of Research and Dialogue for Peace |
| LAF | Legal Aid Forum |
| LUC | Land Use Consolidation |
| MINAGRI | Ministry of Agriculture |
| MINALOC | Ministry of Local Government |
| MINIJUST | Ministry of Justice |
| MINIRENA | Ministry of Natural Resources |
| NAEB | National Agricultural Export Development Board |
| NISR | National Institute of Statistics of Rwanda |
| NORC | National Opinion Research Center |
| RAB | Rwanda Agriculture Board |
| RDB | Rwanda Development Board |

| | |
|-------|--|
| REMA | Rwanda Environment Management Authority |
| RGB | Rwanda Governance Board |
| RNRA | Rwanda Natural Resource Authority |
| SFCG | Search for Common Ground |
| UR | University of Rwanda |
| USA | United States of America |
| USG | United States Government |
| USAID | United States Agency for International Development |

INTRODUCTION

The USAID LAND Project in close partnership with Rwanda Natural Resource Authority (RNRA) organized a research forum to present the findings of a study on the Socioeconomic and Environmental Impacts of the Land Use Consolidation Program that was championed by the University of Rwanda. The forum was held on Friday, November 14, 2014 at Lemigo Hotel and attended by 40 representatives from the Parliament, Rwanda Agricultural Board (RAB), Rwanda Governance Board (RGB), Ministry of Environment and Natural Resources (MINIRENA), the Rwanda Natural Resources Authority (RNRA), the Ministry of Justice (MINIJUST), and the Ministry of Local Government (MINALOC) in addition to research institutions/academia, civil society organizations (CSOs) and the donor community.

SESSION 1: OPENING AND INTRODUCTION TO WORKSHOP

1.1 Opening remarks by Emily Kronic

In her opening remarks, the Democracy & Governance Office Director, Emily Kronic thanked the participants for honoring the invitation. She welcomed participants from GoR, Civil Society Organizations (CSOs) and the donor community. She recalled that during the first National Land Research Agenda held in September 2012 with the purpose of selecting three research topics, the economic, social and environmental analysis of Rwanda's Land Use Consolidation Program was one of the topics selected.



Anna Knox, Chief of Party, LAND Project (left) and Emily Kronic, Democracy & Governance Office Director, USAID (right)

Through a competitive tender process, the University of Rwanda was selected to undertake the research with technical support from the University of San-Francisco and NORC at the University of Chicago. She further noted that land is the core livelihood resource for many Rwandans and one of Rwanda's most challenging issues. She reiterated that the United States government supports research to inform Government of Rwanda (GOR) policies and that this study will allow experts to discuss and debate the impact of Land Use Consolidation policy in Rwanda with the aim of understanding deeply how the policy is impacting ordinary lives in Rwanda. She concluded by urging participants to actively participate and engage in a healthy dialogue and debate.

1.2 Welcome remarks by Anna Knox

The LAND Project Chief of Party, Anna Knox, made welcome remarks on behalf the RNRA Deputy Director General (DDG), Lands and Mapping. She noted that RNRA is the project's primary counterpart and that she had been asked by the DDG to extend his apologies for not being able to attend.

Speaking on behalf of the DDG, Ms. Knox extended recognition to this study as a unique one. Several reports have been written on land use consolidation (LUC). However, this study is perhaps the first that has involved widespread consultation with farmers who are actually participants in the LUC program to understand their experiences and perspectives. This research, undertaken by University of Rwanda researchers with support from NORC, is one that is well positioned to inform policy.

She also stresses the importance of present and invited experts to provide their comments on the results of this research and discuss how to implement the recommendations for policy. This is an especially timely moment to do so given that there is an ongoing review of the ministerial order on land use consolidation that is being championed by MINAGRI.

She concluded on behalf of the DDG by urging Rwandans – whether policy makers, civil society representatives or the general public – to take the time read research reports and use research to make sound policy decisions that are based on robust empirical evidence.

1.3 Objectives of the forum

The Chief of Party presented the forum's objectives as follows: 1) present the findings of the recently completed research and corresponding recommendations; 2) elicit participant input and discussion on the proposed recommendations for policy and practice; and 3) gather participants' ideas for how final recommendations can most effectively influence policy and practice to support a robust agricultural sector, food security, improved livelihoods and poverty reduction.

This was followed by a round of introductions of participants. Appendix 1 contains the participants list.

SESSION 2: PRESENTATION OF RESEARCH ON THE SOCIOECONOMIC AND ENVIRONMENTAL IMPACTS OF THE LAND USE CONSOLIDATION PROGRAM

The presenter acknowledged the team members who contributed tirelessly to the success of the study. These include:

- Prof. Herman Musahara
- Dr. Theophile Niyonzima
- Claude Bizimana
- Birasa Nyamulinda

Birasa, the current research team leader, indicated that the team of local researchers received external technical support from the University of San-Francisco and NORC at the University of Chicago. He further noted that the study has been presented in different forums in Dar es Salaam, Kampala, and in Washington DC.

The study aims to inform the further development of policies in Rwanda that contribute to improvements in agricultural productivity, food security, risk resilience and poverty reduction.

2.1 Main objectives of the study

- To assess and document the socio-economic and environmental effects of Land Use Consolidation in Rwanda;
- To describe where, when and how CIP-LUC is being implemented, including selection criteria for implementation, crops being promoted in different areas, extent to which LUC is delivered together with other components of the CIP, size of plots being grouped, implementation in hillsides versus lowlands;
- To assess the degree to implementation of CIP-LUC on whether it is voluntary and farmers have an opportunity to participate in decision-making about its implementation;
- To evaluate the degree of adoption of LUC in places it has been introduced as well as factors influencing adoption.

2.2 Key challenges

- Lack of reliable markets for most crops
- Lack of storage facilities for most of the sites visited
- In most sites surveyed, farmers were not organized into cooperatives and this deprives bargaining power
- In most villages there are no processing facilities e.g. for maize , wheat and cassava
- Sometimes seeds distribution is delayed

- Farmers claim the amount required to pay for fertilizer is too high for them to afford at once
- Credit facilities are not available at all sites

2.3 Key findings and conclusions from the study

1. Most but not all farmers are satisfied with LUC and believe it has brought them benefits, including increased yields.
 - Nearly two-thirds of the farmers reported they were satisfied with LUC; majority of the farmers have a positive view on the program;
 - Over 10% indicated that they are dissatisfied with LUC
 - 18.5% claimed that their yields have diminished since they joined the LUC program
2. While both satisfaction and agricultural productivity of land are high, food insecurity, vulnerability to shocks and poverty remain a serious problem for LUC farmers.
 - Two-thirds of the farmers reported their household did not have enough food to eat in the past week.
3. Participation in LUC provides farmers with important access to inputs, such as improved seeds and fertilizers, as well as frequent visits by extension agents and these aspects should be emphasized.
 - 83% of the farmers included in the household survey reported using improved seeds, while over $\frac{3}{4}$ used fertilizers, either organic or chemical.
4. Although LUC is voluntary by law, many farmers felt some degree of pressure to participate and initially exhibited resistance to the program. Working with farmers to understand and address these concerns when rolling out the program to new areas should receive greater emphasis.
 - 24% of farmers in the survey indicated that their participation in LUC was not voluntary;
 - 45% of farmers in the survey reported having felt resistance to the program.

Points to the need to engage in better communications with farmers to improve program design

5. Farmers lack access to storage and post-harvest processing for crops, which should be emphasized to maximize productivity benefits.
 - Only 22% of farmers had access to storage facilities;
 - Only 12% processed crops post-harvest and over 59% of total output was sold on average.

2.4 Presentation on Econometric Analysis by Benjamin (Ben) Linkow

Ben presented on the econometric analysis part of the study. This included the factors that determine whether a LUC farmer: 1) is very satisfied with the program, 2) reports producing greater yield since joining LUC, and 3) believes the program had a big positive change for their household.

Summary of key findings

Being “very satisfied” with the program is positively associated with more frequent extension visits and higher agricultural output. These associations are statistically significant.

Reporting greater yields is positively associated with more frequent extension visits, higher agricultural output, access to fertilizer subsidies and lower levels of education. These associations are statistically significant.

A farmer reporting a “big positive change” from participating in the LUC program is positively associated with years since joining LUC, access to fertilizer subsidies, higher agricultural output, being younger, and having a lower level of education. These associations are statistically significant.

The full presentation is contained in Appendix 2.

SESSION 3: PLENARY DISCUSSIONS

After the presentation, the plenary discussions were facilitated by Mireille Ikirezi, the LAND Project M&E Advisor. The following comments and questions were raised by participants:

RGB: requested more clarifications on econometrics provided by the researcher to enable ordinary people to understand the causal relationships. He also wished to know the average of farm size for those in the LUC program as compared to non-LUC participants.

He noted that a lot of effort is required to educate farmers to understand the benefits of the LUC program. Besides the eight priority crops in the LUC program, farmers cultivate other crops not in the program around their houses.

COP-PSDAG: wanted to understand why a big percentage of people were not able to afford meals one week before the survey and requested more data was available to explain this. UR researchers suggested that this may be due to shocks affecting their harvests (bad/heavy rains, drought, etc...) which cannot be controlled by farmers themselves. They reported that some farmers at times sell off all their produce and remain with no food in their households.

MINALOC: DG pointed out most challenges identified by the study have now been solved, but acknowledged that there are some persisting challenges which will be addressed in the long run. He reiterated that different programs have been put in place such as the District Performance Contracts, Umurenge SACCO to enable farmers to acquire loans within their means. All 416 sectors now have Cooperative Banks. He admitted that farmers showed some level of resistance to LUC program. He further indicated that during the systematic land registration, there was a myth that the government would take away the land from the poor and

give it to the rich. The presenter suggested that were the study to be carried out now, the findings would likely be different.

NISR: Requested the Research Team to demonstrate how the sampling was done to cover the stated sample population.

ActionAid: wanted to know why sustainability of LUC as far as climate change is concerned is not featured in the study. Researchers acknowledged that though climate variability is very key, the study had not tackled it and recommended further research on that aspect.

The participant also raised concerns about the high costs of agriculture inputs which many local farmers cannot afford, claiming that this negatively impacts farmers' production. He recommended that in order to address the issue of expensive fertilizers and delayed seeds, farmers should be encouraged to use compost and manure in their farms. Timely distribution of seeds is very important. However, the concern remains, after the LUC program, the distribution of seeds might stop. Even though MINAGRI has been assisting farmers by buying seeds and fertilizers from input operators and they pay later, there is need to engage the Private Sector more in the distribution of seeds and fertilizers.

Director of Lands, MINIRENA: indicated that it has been scientifically proven that use of chemical fertilizers only destroys soils and can hamper production and recommended mixing it with lime.

Search for Common Ground (SFCG): requested the number of farmers not in the LUC program who wish to join voluntarily. Non LUC farmers may wish to join the program to get the inputs. He noted that the program is growing and that the amount of land under LUC is increasing.

The UR researchers recounted an example of cassava farmers in Nyamasheke district who initially received improved inputs. Later on, they stopped receiving the inputs, but decided to use their own money to buy the inputs. Gradually, they started earning a lot of money and now they are considered as "*Abakungu*" (millionaires).

RAB: pointed out that LUC sites are not organized in the same way and some farmers are not organized in cooperatives and or their cooperatives lack effective leadership.

High Institutional Capacity Development, Rwanda (HICD/R): expressed concerned about the big gender disparity in the study and yet women are custodians of food in their households. The UR researchers admitted that women are indeed custodians of food but the research did not specifically target women, only heads of household. Because heads of household were mostly men, respondents were predominantly male.

SESSION 4: SMALL GROUP DISCUSSIONS

Group A

1. Are the recommendations provided appropriate- why or why not?

- Participants suggested combining the two parts of the recommendations under one section. (The recommendations presented by Ben Linkow were separate from those presented by Birasa Nyamulinda);
- Participants suggested separating general recommendations related to agriculture sector from very specific ones related to LUC;
- LUC is the pillar of CIP and many stakeholders are involved in its implementation. Therefore, there is a need to specify the role of each stakeholder involved in implementing the LUC in taking up the recommendations.



Participants during group discussions

2. What other recommendations can be derived from the evidence? Specifically, what are the implications for policy on land use consolidation and the CIP?

- Incorporate other existing programs such as the SACCO (savings scheme) into LUC;
- Introduce farming insurance products aimed at insuring shocks. This has to be done after an assessment of the appropriate mechanisms to be employed and the possibility for Government to provide subsidies to attract Insurance Companies in order to mitigate their risks. Examples of Kenya, Latin America, Europe and USA were suggested for agricultural insurance products.
- Establish “Learning Farms” to provide information to farmers on market prices, seeds, weather, agricultural seasons, etc..

- Establish community seed banks near LUC sites in each sector to help ensure good quality seeds and availability before each agricultural season.
- Where possible, test and promote rotation of crops instead of general application of mono-cropping in order to reduce vulnerability to shocks and increase sustainability and food security.

3. How can these policy recommendations be taken forward and put into action?

- Participants proposed to channel the recommendations through appropriate institutions responsible for their implementation;
- Update the proposed policy brief and circulate it to relevant institutions, such as the Parliament and the Prime Minister's Office;
- Organize a policy round table with all relevant institutions, including community representatives, farmer representatives, CSOs, private sector representatives and development partners.
- Publish leaflets to be shared to specific agriculture zones to address specific issues.

Group B

While responding to the questions, the group members sub-divided their recommendations into two: 1) Recommendation for policy and 2) Recommendation for further research

Recommendations for Policy

- Harmonize policies related to land use that affect; i) productivity, ii) post-harvest, iii) access to markets, etc.
- Strengthen agriculture extension services and access to timely delivery of inputs;
- Increase civic participation in LUC program; ensure substantial involvement of the beneficiaries;
- Strengthening the communication strategy used in implementation of the LUC program In order to address resistance to the program.

Recommendations for further research

- Most but not all farmers are satisfied with LUC and believe it has brought them benefits, including increased yield. The group finds it vague and ask, "who are the most and who are the least in terms of numeric or percentage and what are the characteristics," and request for more specificity;
- Further research should be carried out on categorization of farmers;
- More research on LUC effects on the environment is needed to complement this study

SESSION 5: PLENARY DISCUSSIONS ON SMALL GROUP PRESENTATIONS

After each group shared their proposals from the group discussions, the Chief of Party wanted to know which institution would be most appropriate to lead a round table to discuss the findings. She offered that if MINAGRI or RAB would organize the policy round table, the LAND Project could provide support.

On the aspect of environment, one participant noted that the researchers covered mostly the economic and social analysis of LUC by assessing the farmers' perspectives and other key factors.

The environmental analyst from RDB pointed out that the title of the study is kind of misleading. It should be made clear that researchers focused on the perspectives on a variety of aspects of LUC from participating farmers and other key actors but not the environmental analysis. He further proposed that the title be modified to reflect the content.

The Chief of Party noted that it proved not possible for UR to gather hard scientific data on environmental factors to complement farmer perceptions of environmental impact that are presented in the study. She remarked that although it is important to get hard scientific data to verify environmental impacts, farmers' perspectives on environmental change are also valuable data that need to be taken seriously.

SESSION 6: CLOSING REMARKS

In her closing remarks, the LAND Project COP applauded the animated participation, strong engagement of the participants. She promised to share the proceedings with the rest of the participants. While acknowledging the positive findings of the study in terms of LUC farmer satisfaction and perceptions of improved yields, she indicated that there is still much for the program to do to address outstanding concerns such as food insecurity, vulnerability to shocks, and poor access to markets and to storage and processing facilities. She noted that every study has its parameters and limitations, and that it is not possible for a single study to respond to all questions posed by stakeholders. Finally, she indicated that participants should continue to nurture this initiative and inform the policy makers so that LUC participants can benefit from implementation of study recommendations.

Appendix 1: Participants' List

| No. | Name | Position | Organization | Tel. & Email |
|------------|-----------------------|---|---------------------|--|
| 1 | Ivan Mbaraga | Program Officer | HICD/R | 0785437921 ivan-mbaraga@hicdr.com |
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| | | | | |
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| 29 | Mireille Ikirezi | M&E Program Advisor | Land Project | |

| | | | | |
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Appendix 2: Presentation on the Socioeconomic and Environmental Impacts of the Land Use Consolidation Program



An Assessment of Socioeconomic and Environmental Impacts of the Land Use Consolidation (LUC) Component of CIP in Rwanda

National Workshop on LUC
14th November 2014
Lemigo Hotel

1

Outline of presentation

- Background of the project
- Presenting the team
- Methodology
- Key findings and challenges
- ✓ Socio-economic indicators
- ✓ Perception on LUC & its implication
- ✓ Perception on Environment
- ✓ Challenges
- ✓ Way forward
- Econometric analysis
- Conclusions and Recommendations

2

The team

- ▶ Prof. Herman Musahara
- ▶ Dr. Theophile Niyonzima
- ▶ Mr. Claude Bizimana
- ▶ Mr. Birasa Nyamulinda

Partnerships

- ✓ **The University of San Francisco**
 - Prof. Elizabeth Katz; Chair of Economics Dept
 - Jim Anderson graduate student at University of San Francisco
- Both helped in Methodology, Questionnaire and Sampling design.*
- ✓ **NORC at the University of Chicago**
 - Benjamin Linkow
 - Nina Brooks

Both contributed to finalizing this report

6

Background

This study was financed by the USAID LAND Project. The contract was signed on 18th March 2013.

• General Objective of the Research

To assess and document the socio-economic and environmental effects of Land Use Consolidation in Rwanda

• Specific Objectives

- ✓ To describe where, when and how CIP-LUC is being implemented, including selection criteria for implementation, crops being promoted in different areas, extent to which LUC is delivered together with other components of the CIP, size of plots being grouped, implementation in hillsides versus lowlands

7

Specific Objectives, cont...

- ✓ To assess the degree to implementation of CIP-LUC on whether it is voluntary and farmers have an opportunity to participate in decision-making about its implementation
- ✓ To evaluate the degree of adoption of LUC in places it has been introduced as well as factors influencing adoption
- ✓ To analyze farmer perspectives on LUC – benefits, challenges, and reasons for the indicated perceptions.
- ✓ To identify and analyze mechanisms of mediating dissatisfaction or avenues for recourse
- ✓ To analyze potential impacts on farmer's livelihoods and the environment of implementing resettlement policies to advance land use consolidation

8

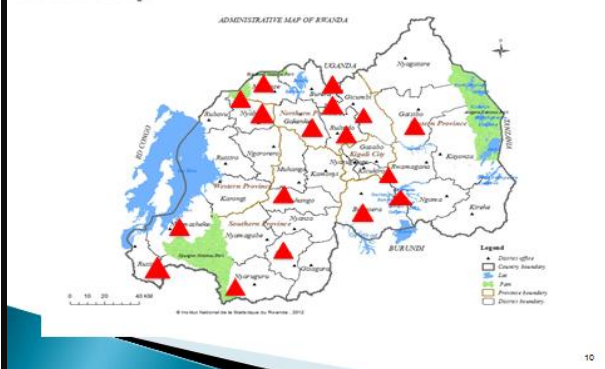
Methodology

Mixed methods : geographic, qualitative and quantitative

- Multi-stage sampling methods
- ▶ Selected from LUC/CIP Sites: Total (until August 2012)
 - 775 sites in Eastern Province
 - 232 in the southern Province
 - 423 in the Northern Province
 - 1069 in the Western Province
- ▶ Selection Criteria:
 - CIP priority crops
 - Age of the sites.
 - Representation of all administrative provinces
 - Representation of diverse agro ecological zones

9

Sites Map



Data Collection

- 18 Focus Group Discussions
- Interview with Key Informants
- Household Survey
- ✓ 658 LUC participants
- ✓ 84 non-LUC

Sites distribution

| Province | Sites |
|-------------------|-----------|
| Eastern Province | 6 |
| Western Province | 5 |
| Southern Province | 3 |
| Northern Province | 6 |
| Total | 20 |

Sample distribution

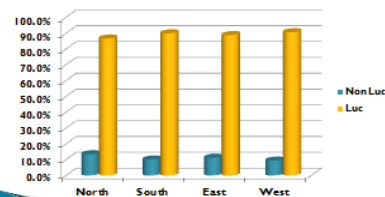
| Province | Households | Percent |
|--------------|------------|------------|
| 1 North | 248 | 33.4 |
| 2 South | 96 | 12.9 |
| 3 East | 251 | 33.8 |
| 4 West | 147 | 19.8 |
| Total | 742 | 100 |

Highlights of Key Findings

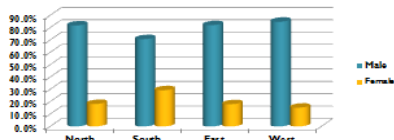
Socio-economic characteristics of respondents

The average household size was 5.7, while the average age of the respondents was 49.5 years in south, 45.4 years in west, 45.4 years in North and 45.6 years in Eastern province.

Distribution of respondents both LUC and Non-LUC per province



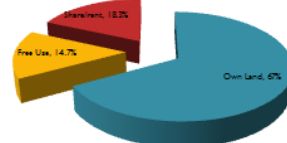
Distribution of respondents by Gender per province



Education Level

| Education level | Percentage |
|----------------------------|------------|
| No school | 20.8% |
| Some Primary | 29.4% |
| Finished Primary | 38.4% |
| Vocation School | 5.3% |
| Finished Secondary | 4.2% |
| Adult Education | 1.5% |
| Some University or College | 0.3% |

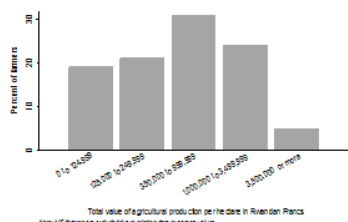
Tenure Status of Cultivated Land



- 92.6% of those who own land had registered their lands
- At least 29% of respondents took a bank loan. The majority 30.8% of them took loans from sources of microfinance, 21% from commercial banks, 17% from cooperatives, and 4.6% from community sources.
- 64% of those who took loans used them for agriculture.

Agricultural Value

Agricultural productivity measured by value of output per hectare of land averaged RWF 860,196 across the sample.



But the value varied according to crop and location.

16

Farmer Perceptions on LUC Program Implementation

17

Perceptions on LUC program

- ▶ LUC has been introduced in all provinces in Rwanda and in all agro ecological zones for different priority crops with different intensity. Maize is more ubiquitous and some priority crops have just been introduced and thus the length of being in LUC has varied data
- ▶ LUC has a complex and contextual character in Rwanda. Farmers still grow other crops and carry out some crop rotation. Farmers in Rwanda are often not dependent on a single LUC crop only as is commonly believed. There is sometimes seasonal crop rotation and farmers often have other side activities near the homes where they grow a mixture of crops.

18

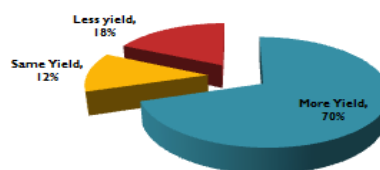
- ▶ Majority of farmers (76 per cent) state that they joined LUC voluntarily while 56 per cent say there was no resistance to the program. However, those who say it was not voluntary are referring to anxieties and uncertainties. A majority, 66 per cent of the respondents felt satisfied by LUC.
- ▶ More than 63.1 of the households perceive that LUC has raised food security. However closer analysis is required to explain why. When asked to recall the situation of food in the household in the last 7 days, a majority indicated problems of portion sizes, number of meals and variety. While there is a possibility of seasonality in food self sufficiency, it may also reflect more deep nutritional needs or simply failing to smoothen out food stock over all 12 months.

19

- ▶ Of the households surveyed, 69 per cent point out that their living conditions have improved. Indeed possession of different household assets was used as one indicator of improving earnings and livelihoods.
- ▶ However there seems to be challenges in storage of harvested crops and/or processing them. About 84 per cent indicate that they had no storage facilities. About 90 per cent indicate lack of access to processing facilities for their harvests.

20

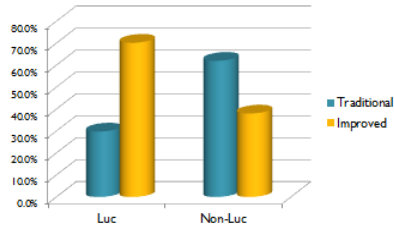
Perception on yield increases



Majority of households perceive increase in yield as a result of introduction of LUC. The perception however varies with AEZs. 100 per cent of the households in Bugarama expresses perceive increases in yield, 59 per cent in Buberuka, 68 per cent in Eastern Ridge and Plateau, and 91 per cent in Central Plateau. Farmers in Eastern Savannah, however, indicated a decline in yield since introduction of the LUC.

21

Further analysis shows that 66.5% of respondents used improved seeds while 33.5% used traditional varieties. However, comparing LUC and non-LUC Farmers, the application of improved seeds varieties is far different.

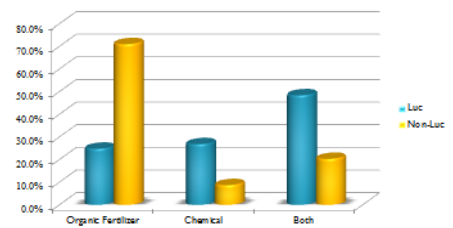


However, for LUC farmers availability and use of improved seeds varied between priority crops.

24

Use of inputs

In general 30% of the respondents used organic fertilizer, 24.7% used chemical fertilizer and 45.3% used both. The figure below compares LUC and Luc farmers in this regard



23

Key Challenges

- Lack of Reliable market for most crops
- Lack of storage facilities for most of the sites visited
- In most sites surveyed, farmers were not organized into cooperatives and this deprives bargaining power
- In most villages there are no processing facilities e.g. , maize , wheat and cassava
- Sometimes seeds distribution is delayed
- Farmers claim the amount required to pay for fertilizer is too high for them to afford at once
- Credit facilities not available at all sites

31

Perception of Production and Prices

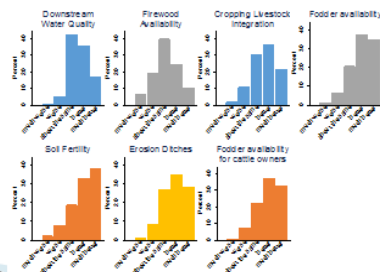
Production, sales and average price between seasons A and B

| Crop | Season A | | | Season B | | |
|-----------|------------------|------------|---------------|------------------|------------|---------------|
| | Production (Kgs) | Sold (Kgs) | Average Price | Production (Kgs) | Sold (Kgs) | Average Price |
| Maize | 544 | 541 | 184 | 280 | 257 | 186 |
| Wheat | 154 | 136 | 298 | 138 | 134 | 284 |
| Cassava | 1365 | 879 | 165 | 382 | 365 | 197 |
| Irish | | | | | | |
| Potatoes | 1526 | 1279 | 134 | 1189 | 1122 | 147 |
| Rice | 683 | 675 | 250 | 746 | 742 | 246 |
| Beans | 273 | 249 | 286 | 430 | 356 | 290 |
| Soya bean | 240 | 221 | 295 | 173 | 150 | 264 |

25

Perceptions on Environment:

The majority of respondents report improvements in soil fertility, the quality of erosion ditches and prevalence of soil erosion, fodder availability, livestock integration, and the prevalence of tree plantations



30

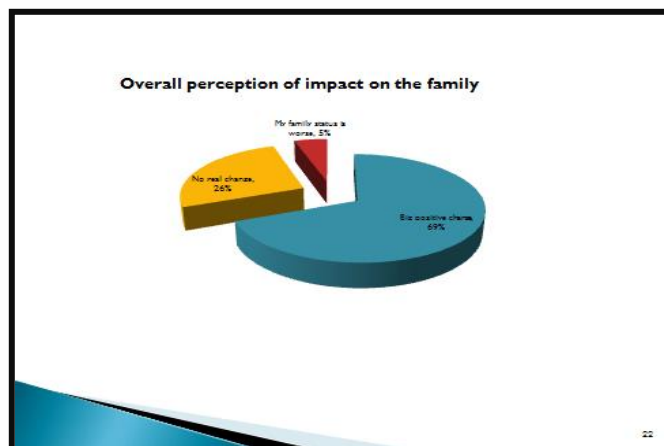
Food security

- Over 50% of the respondents experienced food shortage some 7 days before the survey

Food security within respondent households

| | Frequency |
|--|-----------|
| Household did not have enough food in the past week (% of respondents) | 67% |
| Relied on less preferred and less expensive food (% of respondents) | 50% |
| Borrowed food or relied on help (% of respondents) | 16% |
| Limited portion size at mealtimes (% of respondents) | 47% |
| Reduced consumption by adults (% of respondents) | 29% |
| Reduced number of meals eaten in a day (% of respondents) | 44% |

27

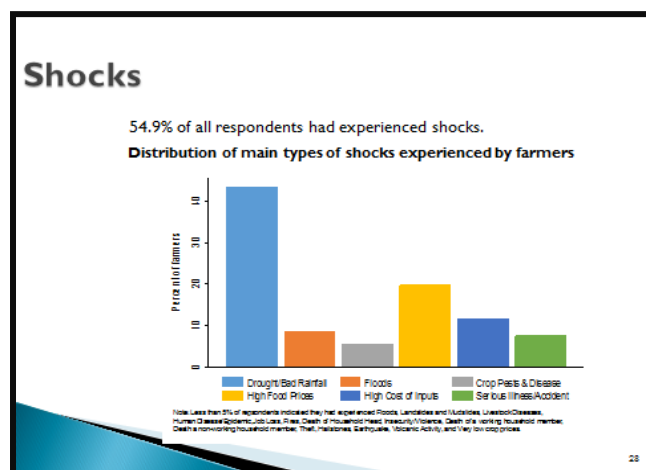


Farmer Perceptions on Environment

Sales channels

| Sales Channel | Wheat | Maize | Rice | Irish Potatoes | Soya bean | Beans | Cassava |
|----------------------|-------|-------|-------|----------------|-----------|-------|---------|
| Sold in the field | - | 4.9% | - | 16.7% | - | - | 10% |
| Trader in the market | 56.5% | 47.5% | 1.9% | 77.3% | 33.3% | 24.7% | 30% |
| Individual buyer | 24.0% | 44.3% | 35.9% | 3.0% | 46.7% | 63.5% | 60% |
| commercial company | - | 3.3% | - | - | 6.7% | - | - |
| Cooperative | 12.9% | - | 62% | 1.5% | 13.3% | 11.8% | - |
| RAB | 3.6% | - | - | - | - | - | - |
| Other | 3.0% | - | - | 1.5% | - | - | - |

- ### Econometric Analysis
- ▶ Goal: investigate causal relationships in the data
 - ▶ What are the factors that determine whether a LUC farmer:
 - Is "very satisfied" with the program
 - Reports producing greater yield since joining
 - Believes the program had a "big positive change" for their household



Econometric Analysis

Probit regression results: farmer is “very satisfied” with LUC

| | Coeff. | Standard error | z-score | p-value |
|---|----------|----------------|---------|---------|
| Household size | -0.00076 | 0.009744 | -0.08 | 0.938 |
| Member of coop. | 0.006598 | 0.055666 | 0.12 | 0.906 |
| Female headed HH | 0.011206 | 0.041365 | 0.27 | 0.786 |
| HH head age | -0.00105 | 0.001392 | -0.75 | 0.451 |
| HH head has some schooling | -0.08002 | 0.052161 | -1.53 | 0.125 |
| HH head finished primary school | -0.05171 | 0.085339 | -0.61 | 0.545 |
| Log of non-agricultural income | 0.001391 | 0.003668 | 0.38 | 0.705 |
| Land size (ha.) | 0.010472 | 0.026839 | 0.39 | 0.696 |
| Years in LUC program | 0.016073 | 0.015041 | 1.07 | 0.285 |
| Access to fertilizer subsidy | 0.084921 | 0.060973 | 1.39 | 0.164 |
| Monthly visits by extension agent | 0.210296 | 0.054204 | 3.88 | 0.000 |
| Seasonal visits by extension agent | 0.047594 | 0.064513 | 0.74 | 0.461 |
| Log of value of agricultural production | 0.084834 | 0.019763 | 4.29 | 0.000 |

36

Probit regression results: farmer reports higher yields

| | Coeff. | Standard error | z-score | p-value |
|---|----------|----------------|---------|---------|
| Household size | 0.005712 | 0.010567 | 0.54 | 0.589 |
| Member of coop. | 0.013917 | 0.050677 | 0.27 | 0.784 |
| Female headed HH | 0.059397 | 0.049133 | 1.21 | 0.227 |
| HH head age | -0.00157 | 0.001478 | -1.06 | 0.287 |
| HH head has some schooling | -0.08151 | 0.029437 | -2.77 | 0.006 |
| HH head finished primary school | -0.14838 | 0.063281 | -2.34 | 0.019 |
| Log of non-agricultural income | 0.002149 | 0.003612 | 0.59 | 0.552 |
| Land size (ha.) | -0.00472 | 0.005322 | -0.89 | 0.375 |
| Years in LUC program | 0.004929 | 0.01685 | 0.29 | 0.770 |
| Access to fertilizer subsidy | 0.159072 | 0.039079 | 4.07 | 0.000 |
| Monthly visits by extension agent | 0.217613 | 0.061967 | 3.51 | 0.000 |
| Seasonal visits by extension agent | 0.113728 | 0.041075 | 2.77 | 0.006 |
| Log of value of agricultural production | 0.114809 | 0.020024 | 5.73 | 0.000 |

37

Way forward

- ▶ Establish crop collection points/centers, especially for Maize, Cassava, Wheat
- ▶ Assist in Market Information Services especially on price and demand
- ▶ Enhance and facilitate contract farming. This will attract private operators. It can be done in two ways:
 - ✓ **Intermediate contract:** few large traders “agents” contracted to supply inputs & collect produce from smallholders-especially at the sites where cooperatives are in-existent
 - ✓ **Contracting with farmer organizations** “Cooperatives
- ▶ Farmers should be encouraged and facilitated to form cooperatives where these do not exist in order to increase their bargaining power

32

Way forward, cont.....

- ▶ Farmers should be supported to acquire appropriate post-harvest handling facilities and improve their marketing strategies.
- ▶ Ishwagara/Lime should be made available to farmers because it is considered to be more productive and it can last longer than chemical fertilizers.
- ▶ The rural financing schemes should be developed and made accessible to all value chain actors
- ▶ Seeds should be supplied the earliest possible in order to avoid crop failure.
- ▶ Farmers Field School should be strengthened and out scaled

33

Caveats and Limitations

- ▶ Findings should be interpreted as suggestive rather than definitive, as hidden relationships in the data could explain some findings
- ▶ Additional analysis could not rigorously establish the causal impact of participating in LUC on outcomes

40

Conclusions and Recommendations

41

Conclusions and Recommendations

- ▶ Most but not all farmers are satisfied with LUC and believe it has brought them benefits, including increased yield
- ▶ While both satisfaction and agricultural productivity of land are high, food insecurity, vulnerability to shocks, and poverty remain a serious problem for LUC farmers
- ▶ Our statistical analysis was not able to establish conclusively the extent to which LUC has caused changes in outcomes for participating farmers and their households
- ▶ Participation in LUC provides farmers with important access to inputs, such as improved seed and fertilizer, as well as frequent visits by extension agents and these aspects should be emphasized

42

Conclusions and Recommendations

- ▶ Although LUC is voluntary by law, many farmers felt some degree of pressure to participate and initially exhibited resistance to the program. Working with farmers to understand and address these concerns when rolling out the program to new areas should receive greater emphasis
- ▶ Farmers tend to perceive positive trends in environmental outcomes overall with only a very small minority viewing them as having gotten worse following LUC
- ▶ Farmers tend to lack access to storage and post-harvest processing for crops, though these are part of CIR, which may prevent farmers from fully realizing the benefits of LUC

43

Probit regression results: farmer indicates "big positive change"

| | Coeff. | Standard error | z-score | p-value |
|---|----------|----------------|---------|---------|
| Household size | 0.004161 | 0.007059 | 0.59 | 0.556 |
| Member of coop. | 0.072046 | 0.046605 | 1.55 | 0.122 |
| Female headed HH | 0.025101 | 0.049742 | 0.5 | 0.614 |
| HH head age | -0.00228 | 0.001047 | -2.17 | 0.030 |
| HH head has some schooling | -0.08223 | 0.041106 | -2 | 0.045 |
| HH head finished primary school | -0.13087 | 0.064074 | -2.04 | 0.041 |
| Log of non-agricultural income | 0.003928 | 0.003062 | 1.28 | 0.200 |
| Land size (ha.) | 0.005746 | 0.027248 | 0.21 | 0.833 |
| Years in LUC program | 0.028995 | 0.01582 | 1.83 | 0.067 |
| Access to fertilizer subsidy | 0.087618 | 0.038531 | 2.27 | 0.023 |
| Monthly visits by extension agent | 0.070407 | 0.072691 | 0.97 | 0.333 |
| Seasonal visits by extension agent | -0.00795 | 0.06372 | -0.12 | 0.901 |
| Log of value of agricultural production | 0.112496 | 0.017071 | 6.59 | 0.000 |

38

Econometric Analysis: Summary of Key Findings

- ▶ Factors associated with:
 - Being "very satisfied" with the program:
 - More frequent extension visits
 - Higher agricultural output
 - Reporting greater yields:
 - More frequent extension visits, higher agricultural output
 - Access to fertilizer subsidies
 - Lower levels of education
 - "Big positive change" from program:
 - Years since joining LUC
 - Access to fertilizer subsidies
 - Higher agricultural output
 - Younger, lower levels of education

39

Thank you

44